

Two Western Australian species of *Ozothamnus* transferred to *Pithocarpa* (Asteraceae: Gnaphalieae)

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Abstract

Barrett, R.L., Schmidt-Lebuhn, A.N. & Thiele, K.R. Two Western Australian species of *Ozothamnus* transferred to *Pithocarpa* (Asteraceae: Gnaphalieae). *Nuytsia* 23: 103–108 (2013). Two Western Australian species currently referred to the genus *Ozothamnus* R.Br. have in the past been considered poorly aligned with that genus, but their alternative placement has been uncertain. Recent molecular studies have suggested that they are best placed in the Western Australian endemic genus *Pithocarpa* Lindl. The following new combinations are made: *Pithocarpa cordata* (DC.) Schmidt-Leb. & R.L.Barrett and *Pithocarparamosa* (DC.) Schmidt-Leb. & R.L.Barrett. Four species are now recognised in *Pithocarpa* and all are listed here. A key to the expanded genus is provided. Scanning electron micrographs are provided for a range of features for all taxa.

Introduction

Species treated here have all been included in a broadly defined *Helichrysum* Mill. in the past (Candolle 1838; Burbidge 1958). With the segregation of all Australian native taxa as distinct genera from *Helichrysum* (Wilson 1992, 2008a, 2008b, in prep.; Anderberg *et al.* 2006), the placement of a number of Western Australian taxa has been considered problematic. Anderberg (1991) revised the classification of the tribe Gnaphalieae and concluded that *Helichrysum cordatum* DC. was best accommodated in a broadly defined *Ozothamnus* R.Br. until more data could be obtained on its relationships. Wilson *et al.* (1992), also hesitant as to the correct placement of this species, nevertheless transferred the closely related *Helichrysum ramosum* DC. to *Ozothamnus* for consistency. In revising the Australian species of *Helichrysum*, Burbidge (1958) included these two species in the small section *Hebelaena* (DC.) N.T.Burb.; they are the only Western Australian representatives of the section.

The genus *Pithocarpa* Lindl. was established by Lindley (1839), revised by Lewis and Summerhayes (1951) and revised again by Lepschi (1999). It currently comprises three taxa (*P. corymbulosa* Lindl. and two varieties of *P. pulchella* Lindl.) and is endemic in the south-west of Western Australia. Various relationships for *Pithocarpa* have been proposed by earlier authors (see Lepschi 1999).

A recent molecular study by Schmidt-Lebuhn and Constable (2012) found strong support for a clade comprising *Pithocarpa*, *O. cordatus* (DC.) Anderb. and *O. ramosus* (DC.) Paul G. Wilson based on ETS and ITS nrDNA sequence data. This clade was placed well outside of the large and strongly supported clade comprising the core of *Ozothamnus*, *Cassinia* R.Br. and related genera. While generic limits in the larger clade remain uncertain, the basal position of the small *Pithocarpa* clade and its endemism in Western Australia means that it is likely to remain distinct at generic rank no matter what circumscriptions are adopted in the larger clade.

Morphologically, *O. cordatus* and *O. ramosus* share with the two *Pithocarpa* species a perennial, openly tangled habit, short-lived branches, a dense, cobwebby indumentum and radiating, white, petaloid bracts. The eastern Australian members of 'sect. *Hebelaena* (DC.) N.T.Burb.'¹ have herbaceous, non-radiating bracts and a different habit (though *O. whitei* (N.T.Burb.) Anderb. is similar in habit). Comparative illustrations are provided in Figures 1 and 2.

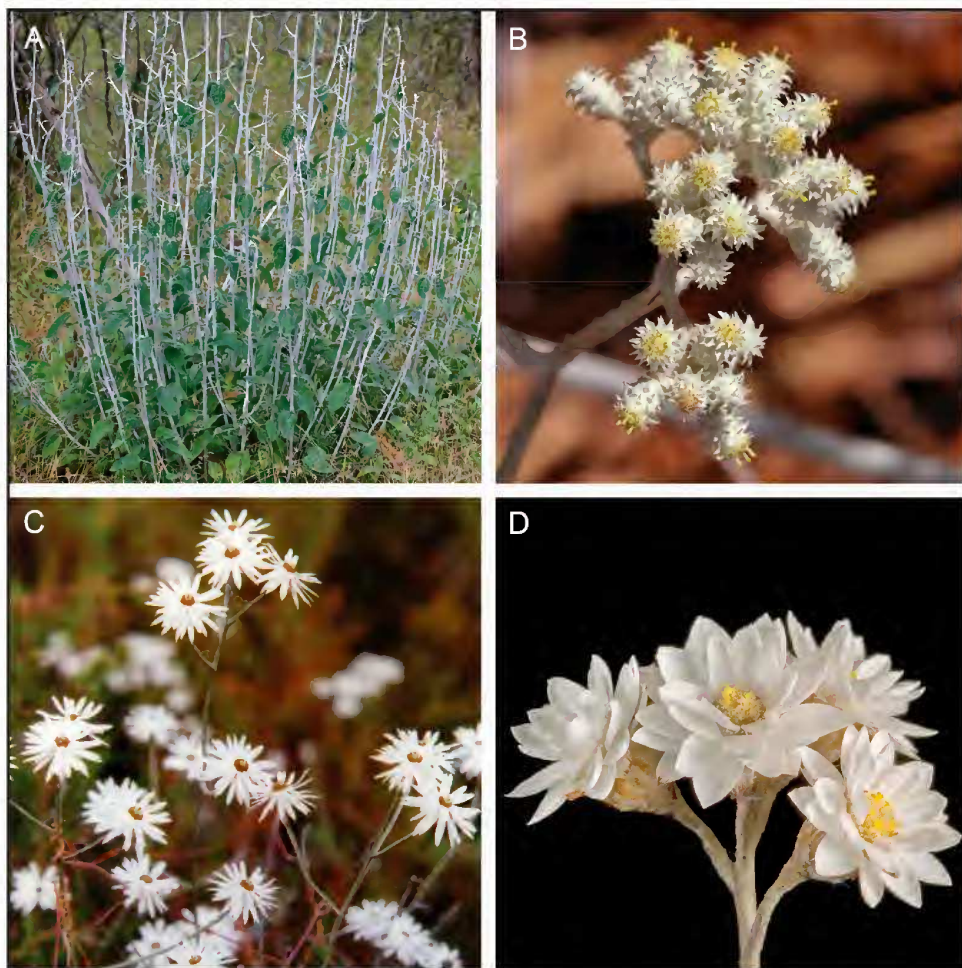


Figure 1. Comparative photographs of *Pithocarpa* species. A, B – *P. cordata* (Kings Park, unvouchered, photographs by R. Barrett). C, D – *P. pulchella* var. *pulchella* (C – Ellis Brook Valley Reserve, voucher H. Bowler 325 photograph by H. Bowler; D – Badgingarra, voucher K.R. Thiele 3200, photograph by K. Thiele).

¹While the species included under *Helichrysum* sect. *Hebelaena* by Burbidge (1958) have continued to be recognised as a distinct group under *Ozothamnus*, the section name has never been officially combined under *Ozothamnus*.

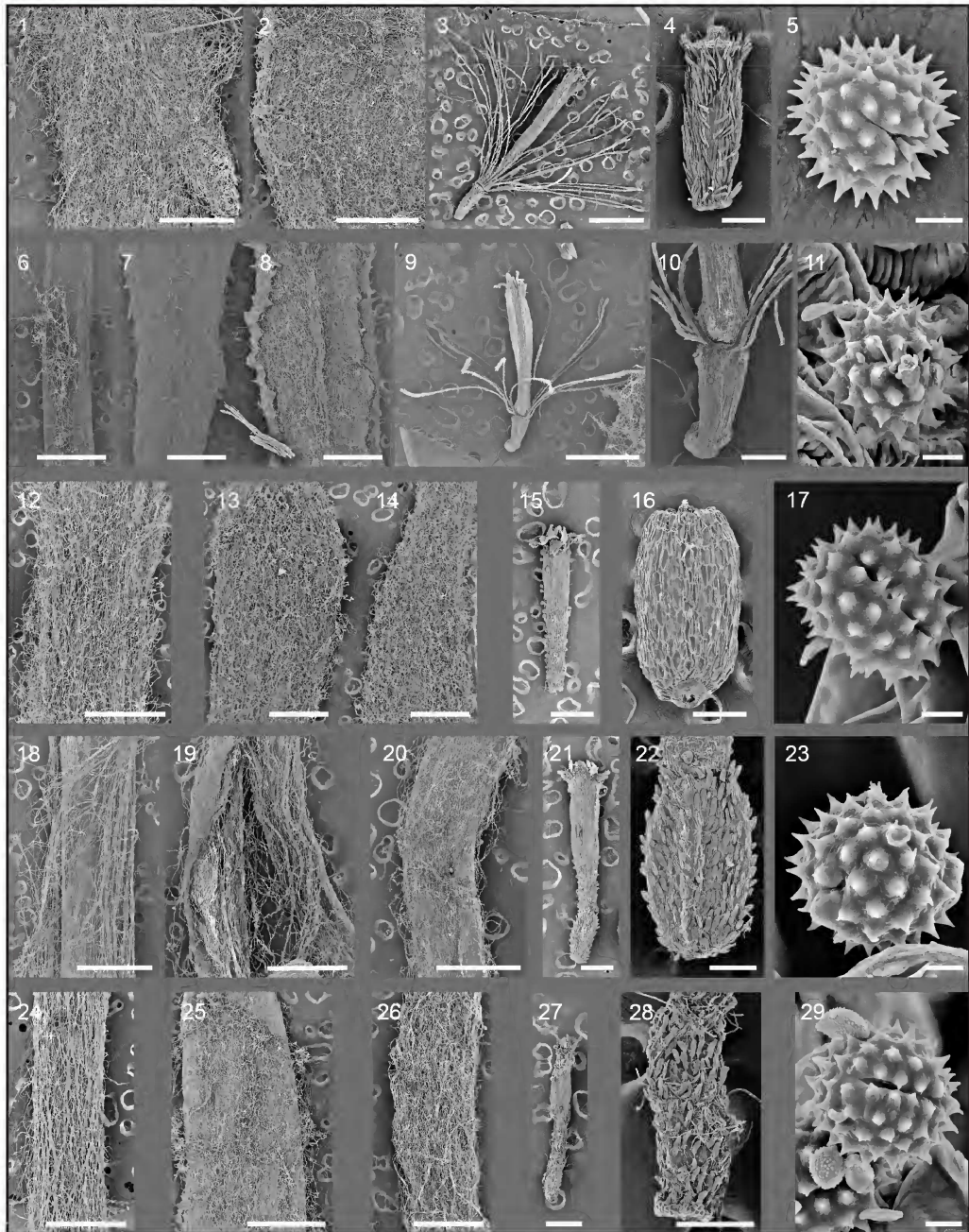


Figure 2. Scanning electron micrographs of *Pithocarpa* taxa, from left to right in each row: stem indumentum; leaf indumentum (adaxial and abaxial; adaxial only for *P. cordata*); flower; achene; pollen. 1–5 – *P. cordata* (C.A. Hortin 8/27, PERTH 04191684). 6–11 – *P. ramosa* (E.J. Croxford 4962, PERTH 04434668). 12–17 – *P. corymbulosa* (F. Hort 1016, PERTH 05604745). 18–23 – *P. pulchella* var. *melanostigma* (B.J. Lepschi & T.R. Lally BJJ 2591, PERTH 04489667). 24–29 – *P. pulchella* var. *pulchella* (B.J. Lepschi & T.R. Lally BJJ 2889, PERTH 04687841). Scale bars: 1–3, 6–9, 12–15, 18–20, 24–26 = 1 mm. 15, 21, 27 = 500 μ m. 4, 10, 16, 22, 28 = 200 μ m. 5, 11, 17, 23, 29 = 5 μ m. Images by R. Barrett.

Ozothamnus cordatus and *O. ramosus* were included in *Ozothamnus* based on the presence of a pappus of barbed bristles, which in these two species are fused at the base to form a ring and is shed whole (Burbidge 1958). This character is not unique to *Ozothamnus*, being found in a number of related genera including *Cassinia* (Orchard 2004). The two species of *Pithocarpa* s. str. lack a pappus (Lepschi 1999). While the presence or absence of the pappus has traditionally been considered to be of great taxonomic importance in the Asteraceae, it is now widely recognised as highly homoplasious and of limited taxonomic utility (Anderberg 1991; Schmidt-Lebuhn & Constable 2012). Loss of the pappus has occurred multiple times in the *Ozothamnus-Cassinia* clade (Schmidt-Lebuhn & Constable 2012).

The new combinations under *Pithocarpa* are provided here in order to make the names available for a revised edition of *Perth plants* (Barrett & Pin Tay 2005). Descriptions and illustrations of these taxa can variously be found in Burbidge (1958), Grieve and Blackall (1982), Lander (1987), Lepschi (1999) and Wheeler (2002).

Methods

Illustrations are based on photographs of live plants and from herbarium material. Scanning electron microscope images were taken on a Jeol JCM 5000 NeoScope bench-top SEM at Kings Park and Botanic Garden.

Key to taxa of *Pithocarpa*, based on Burbidge (1958) and Lepschi (1999)

- 1: Pappus present, the bristles fused into a basal ring
 - 2: Plants densely tomentose except on the upper surfaces of the leaves
which are sparsely tomentose, leaves ovate to cordate. Laminae of bracts acute **P. cordata**
 - 2: Plants glabrescent, leaves linear to oblanceolate, scabrid above, tomentose or
glabrescent below. Laminae of bracts obtuse **P. ramosa**
- 1: Pappus absent
 - 3: Involucral bracts without dark pigment; capitula in more or less compact,
well-defined corymbs of 2–11 capitula, rarely solitary on lateral branches
within the flowering region; ovary and cypsela glabrous.
(Darling Range E of Perth) **P. corymbulosa**
 - 3: At least some involucral bracts marked with dark reddish maroon on the
abaxial surface; capitula in open, loose corymbs of 2–6 capitula,
as well as solitary, on lateral branches within the flowering region;
ovary and cypsela with antrorse, clavate duplex hairs.
(Widespread in SW WA)
 - 4: Style branches black or very dark brownish black, both in life and
when dried **P. pulchella** var. **melanostigma**
 - 4: Style branches yellowish brown to brown (in life), drying brown **P. pulchella** var. **pulchella**

Taxonomy

Pithocarpa Lindl., *Sketch Veg. Swan R.* 23 (1839). *Lectotype: Pithocarpa pulchella* Lindl., designated by P. Lewis & V.S. Summerhayes, *Kew Bull.* 5(3): 436 (1951).

Helichrysum subser. *Hebelaena* DC., *Prodr.* 6: 180 (1838); *Helichrysum* sect. *Hebelaena* (DC.) N.T.Burb., *Austral. J. Bot.* 6(3): 235 (1958). *Lectotype*: *H. cordatum* DC., designated by N.T. Burbidge, *loc. cit.* (1958).

Pithocarpa cordata (DC.) Schmidt-Leb. & R.L.Barrett, *comb. nov.*

Helichrysum cordatum DC., *Prodr.* 6: 180 (1838); *Gnaphalium cordatum* (DC.) Sch.Bip., *Bot. Zeitung (Berlin)* 3: 170 (1845); *Ozothamnus cordatus* (DC.) Anderb., *Opera Bot.* 104: 89 (1991). *Type*: Western Australia: Barren shores of King George Sound, 1818, *A. Cunningham* (*lecto*: G-DC *n.v.*, designated by N.T. Burbidge, *Austral. J. Bot.* 6(3): 241 (1958); possible *iso*: K *n.v.*).

Pithocarpa corymbulosa Lindl., *Sketch Veg. Swan R.* 23 (1839); *Humea corymbulosa* (Lindl.) F.Muell., *Vict. Naturalist* 9: 144 (1893); *Calomeria corymbulosa* (Lindl.) Heine, *Adansonia* ser. 2, 7: 138 (1967). *Type*: Western Australia: Swan River [Colony, 1830s, *A.*] *Toward s.n.* (*holo*: CGE, photo seen at PERTH).

Pithocarpa pulchella Lindl., *Sketch Veg. Swan R.* 23 (1839). *Type*: Western Australia: Swan River [Colony, 1835–1838], *J. Drummond s.n.* (*holo*: CGE, photo seen at PERTH; possible *iso*: US Sheet No. 230363, barcode 00623569, image seen).

Pithocarpa major Steetz in Lehm., *Pl. Preiss.* 1(3): 446 (1845). *Type*: Western Australia: ‘In solo glareoso - sublimoso planitie sylvae supra oppidulum Guildford’ [In muddy gravel in woodland on the plain beyond the village of Guildford], 9 August 1839, *L. Preiss s.n.* (*type*: LD 1210036, image seen; MEL 238727 *n.v.*).

Note. The two sheets representing the type of *P. major* were probably both seen by Steetz, so both have equal type status. We have no reason to choose a lectotype or to assume they are from different gatherings, so we simply list both as type specimens with no additional status.

Pithocarpa achilleoides P.Lewis & Summerh., *Kew Bull.* 5(3): 437–438 (1951). *Type*: Western Australia: Wooroloo, November 1907, *M. Koch* 1895 (*holo*: K *n.v.*; *iso*: NSW 397293 *n.v.*).

Pithocarpa pulchella var. ***melanostigma*** (P.Lewis & Summerh.) Lepschi, *Nuytsia* 13: 71 (1999); *Pithocarpa melanostigma* P.Lewis & Summerh., *Kew Bull.* 5(3): 438–439 (1951). *Type*: Western Australia: ‘District southwest Plantagenet [District of South West Plantagenet], in scrub on damp hills not far from the sea’, January 1901, *E.G. Pritzel* 243 (*holo*: K *n.v.*; *iso*: AD 97632397 *n.v.*, NSW 397306 *n.v.*; US Sheet No. 406171, barcode 00623573, image seen).

Pithocarpa pulchella Lindl. var. ***pulchella***

Pithocarpa ramosa (DC.) Schmidt-Leb. & R.L.Barrett, *comb. nov.*

Helichrysum ramosum DC., *Prodr.* 6: 181 (1838); *Gnaphalium ramosum* (DC.) Sch.Bip., *Bot. Zeitung (Berlin)* 3: 170 (1845), *nom. illeg., non Lam.*, *Fl. Franç.* 2: 65 (1779); *Ozothamnus ramosus* (DC.) Paul G.Wilson, *Muelleria* 7: 521 (1992). *Type*: Western Australia: shores of King George Sound, *s. dat.*, *A. Cunningham s.n.* (*holo*: G-DC, *n.v.*).

Helichrysum gracile DC., *Prodr.* 6: 181 (1838); *Gnaphalium georgii* Sch.Bip., *Bot. Zeitung (Berlin)* 3: 170 (1845). *Type*: Western Australia: dry barren land, King George Sound, *s. dat.*, A. Cunningham *s.n.* (*holo*: G-DC *n.v.*; *iso*: K *n.v.*).

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